

Appl. No. 09/932,236

REMARKS

Claims 5, 11, 12 and 15-23 are cancelled; claims 1, 2, 4 and 13 are amended; new claims 42-47 are added; and claims 1-4, 6-10, 13, 14 and 42-47 are pending in the application.

Claim 13 stands rejected under 35 U.S.C. §112, as being indefinite. Specifically, the Examiner indicates that the term "activated hydrogen" is unclear, and not adequately defined or discussed within the specification. Without admission as to the propriety of the Examiner's rejection, Applicant has amended claim 13 to indicate that the activated hydrogen is "plasma-activated hydrogen". The term "plasma-activated hydrogen" is utilized in the specification at, for example, paragraph 16, and can be understood by a person of ordinary skill in the art to refer to hydrogen which has been exposed to plasma to form an activated state of the hydrogen. Applicant requests that the Examiner's rejection of claim 13 under 35 U.S.C. §112 be withdrawn in the Examiner's next action.

The pending claims stand rejected over Vaartstra, either alone, or in combination with either Komatsu, Uhlenbrock, or Byun. Applicant notes that Uhlenbrock is not an appropriate reference under 35 U.S.C. §103, in that Uhlenbrock and the present application are both co-owned by Micron Technology, Inc., and Uhlenbrock is only prior art to the present application under §102(e). 35 U.S.C. §103(c) specifically indicates that subject matter which qualifies as prior art only under §102(e) cannot be utilized in a §103 rejection if the prior art was commonly owned by the same person at the time the invention was made. As Uhlenbrock is not an appropriate reference for utilization in a §103 rejection, Applicant requests that the Examiner withdraw Uhlenbrock as a §103 reference against the present application.

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Claim 1 is amended, and as amended is believed allowable over the Examiner's cited references. Amended claim 1 recites a method of forming a released metal consisting essentially of one or more of rhodium, iridium, cobalt, palladium and nickel by exposing one or more metallo-organic precursors comprising one or more of rhodium, iridium, cobalt, palladium and nickel to a reducing atmosphere comprising one or both of plasma-activated hydrogen and H₂. Amended claim one is believed allowable over the cited references for at least the reason that not one of the references suggests or discloses a process wherein a precursor comprising one or more of rhodium, iridium, cobalt, palladium and nickel is exposed to a reducing atmosphere comprising one or both of plasma-activated hydrogen and H₂. As not one of the references suggests or discloses such recited features of claim 1, it is inconceivable that the references could, in any combination, suggest or disclose the subject matter of claim 1. Applicant therefore requests formal allowance of claim 1 in the Examiner's next action.

Claims 3, 6-10, 13 and 14 depend from claim 1, and are therefore allowable for at least the reasons discussed above regarding claim 1. Applicant therefore requests formal allowance of claims 3, 6-10, 13 and 14 in the Examiner's next action.

Referring next to claim 2, such is specifically rejected as being obvious in light of Vaartstra in combination with Komatsu. Applicant requests reconsideration of such rejection. Applicant has amended claim 2 to place the claim in independent form, but has not narrowed the subject matter of claim 2 relative to that submitted in the originally-filed claim. Claim 2 recites a process wherein a metallo-organic precursor which does not comprise platinum is exposed to a reducing atmosphere to release metal from the precursor, and wherein the metal is deposited over a substrate comprising an upper surface which consists of one or more of TiN, elemental Ti, WN, elemental W, TaN and elemental Ta.

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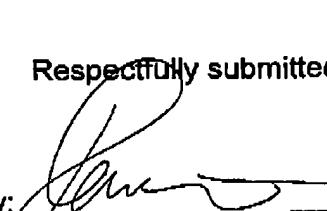
The Examiner recognizes that Vaartstra does not teach the recited substrate having an upper surface consisting of TiN, Ti, WN, W, TaN, or Ta. The Examiner thus cites Komatsu for teaching deposition of a metal over an upper surface comprising one or more of TiN, elemental Ti, WN, elemental W, TaN, and elemental Ta. The Examiner mistakenly indicates that Komatsu shows a metallo-organic precursor utilized in a reducing atmosphere for deposition of a metal over a TiN layer. However, Applicant notes that the metal deposited in a reducing atmosphere is actually placed under a TiN layer. In other words, the TiN layer is formed over the metal deposited in a reducing atmosphere (the metal of layer 83). Thus, Komatsu does not disclose or suggest the claim 2 recited deposition of a metal from a metallo-organic precursor exposed to reducing atmosphere over an upper surface of a material comprising TiN. Accordingly, neither of the Examiner's cited references of Vaartstra or Komatsu disclose the claim 2 recited deposition of metal from a precursor exposed to a reducing atmosphere over an upper surface of material comprising one or more of TiN, elemental Ti, WN, elemental W, TaN and elemental Ta. It is therefore inconceivable that references can, in combination, teach such recited subject matter of claim 2. For the above-discussed reasons, Applicant requests formal allowance of claim 2 over the cited references in the Examiner's next action.

Claim 4 depends from claim 2, and is therefore allowable for at least the reasons discussed above regarding claim 2.

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Respectfully submitted,

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Examiner Hogans, David L.
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Title: Methods of Forming Metal-Comprising Materials and Capacitor Electrodes; and Capacitor Constructions

VERSION WITH MARKINGS TO SHOW CHANGES MADE ACCOMPANYING
RESPONSE TO MAY 22, 2002 OFFICE ACTION

In the Claims

The claims have been amended as follows. Underlines indicate insertions and ~~strikeouts~~ indicate deletions.

1. (Amended) A method of forming a metal-comprising mass for a semiconductor construction, comprising:
 - providing a semiconductor substrate;
 - providing one or more metallo-organic precursors proximate the substrate, at least one of the one or more precursors not comprising platinum, and the one or more precursors comprising one or more of rhodium, iridium, cobalt, palladium and nickel;
 - exposing the one or more precursors to a reducing atmosphere to release metal from the one or more precursors, the reducing atmosphere comprising one or both of plasma-activated hydrogen and H₂, the released metal consisting essentially of one or more of rhodium, iridium, cobalt, palladium and nickel; and
 - depositing the released metal over the semiconductor substrate to form a metal-comprising mass on the semiconductor substrate.

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2. (Amended) The method of claim 1 A method of forming a metal-comprising mass for a semiconductor construction, comprising:
providing a semiconductor substrate;
providing one or more metallo-organic precursors proximate the substrate, at least one of the one or more precursors not comprising platinum;
exposing the one or more precursors to a reducing atmosphere to release metal from the one or more precursors;
depositing the released metal over the semiconductor substrate to form a metal-comprising mass on the semiconductor substrate; and
wherein the substrate comprises an upper surface consisting of one or more of TiN, elemental Ti, WN, elemental W, TaN and elemental Ta; and wherein the upper surface is exposed to the reducing atmosphere during formation of the metal-comprising mass.

4. (Amended) The method of claim 2 1 wherein the substrate comprises an upper surface consisting of one or more of TiN, elemental Ti, WN, elemental W, TaN and elemental Ta; and wherein the metal-comprising mass is formed physically against the upper surface of the substrate.

13. (Amended) The method of claim 1 wherein the reducing atmosphere comprises plasma-activated hydrogen.

Claims 5, 11, 12 and 15-23 are cancelled.

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